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April 30, 1955
VOL. 67, NO. 18

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Delta Jet

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A SCIENCE SERVICE PUBLICATION

MEDICINE

Cancer Antibodies in 25%

➤ ABOUT ONE-FOURTH of the patients who get cancer make in their bodies substances that fight their own cancers. The substances are called antibodies.

This discovery was announced by the American Cancer Society in New York together with announcement of another finding on cancer antibodies.

The second finding is that chemicals resembling those which cause cancer go to the cells in the body which produce antibodies and cause changes in the chemical processes of these cells.

Discovery of the cancer antibodies, with its hint that patients who are producing them may be curable, was made by a husband and wife team, Drs. John and Ruth Graham of Vincent Memorial Hospital-Massachusetts General Hospital, Boston.

In some of the patients, the activity of the cancer antibodies picked up considerably after much or all of the cancer had been removed by surgery. The Boston scientists are trying now to find the kind of cancer chemical that stirs up the antibody reaction.

Atoms of radioactive sulfur and carbon showed Dr. Felix Haurowitz of Indiana University, Bloomington, Ind., that chemicals like those that cause cancer go to antibody factories in the body. He put these radioactive atoms into molecules closely resembling the butter yellow dye that causes liver cancer in rats. Then he bound the radioactive dye molecules to enormous protein molecules and injected them into rats.

Tracing the radioactive chemicals with a Geiger counter, he found that a large proportion went to the antibody-producing cells of the spleen, lymph nodes, liver, bone marrow and tissues under the skin. When the small dye molecules were injected without being bound to the big molecules of proteins like the cancer-causing chemical, only about one-tenth of them went to the antibody-forming cells. The rest were excreted or lost track of.

Dr. Haurowitz's results show that in causing cancer the dyes may somehow change operations within the antibody-making cells generally and may change the protein-making parts of them in particular. This may be the way, it is suggested, that certain cancers of many kinds get their start, by first weakening the body's defenses.

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PHYSICS

First Strong Focusing Atom Smasher at Work

➤ THE FIRST atom smasher using the new method of strong focusing is now working, Dr. Robert R. Wilson, director of the Newman Laboratory of Nuclear Studies at Cornell University, Ithaca, N. Y., revealed.

The electron synchrotron, successfully operated at energies of 575,000,000 electron volts, is designed to go to a billion and a half. Electrons are light-weight, fundamental particles of the atom having a negative charge.

Synchrotrons accelerate particles by spinning them around a circular path. Strong focusing keeps the particles on a much narrower path than has previously been possible, allowing scientists to get higher energies with less machine.

The new focusing theory was worked out by physicists at a number of institutions, particularly the Brookhaven National Laboratory, Upton, L. I. (See SNL, Feb. 13, 1954, p. 105.)

The accelerator, built with funds from the Office of Naval Research, measures 26 feet across.

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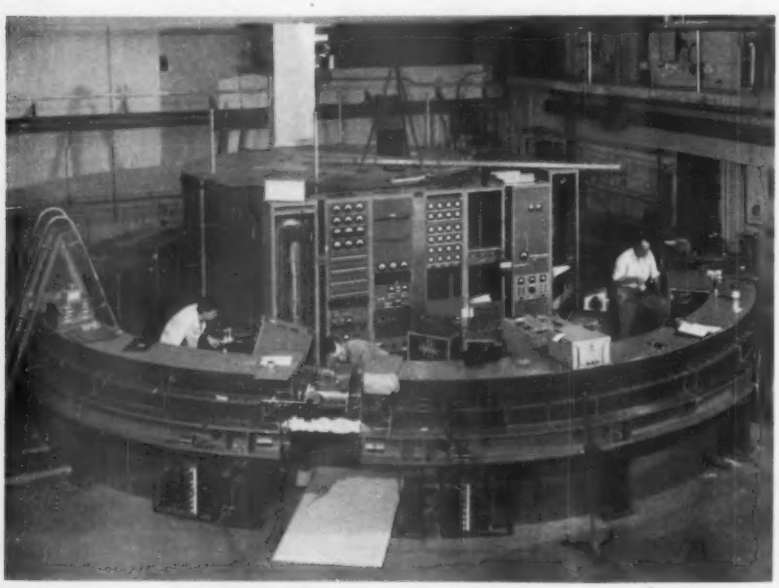

FOCUSING SYNCHROTRON—Cornell University's new atom smasher encircles older, more conventional model. The first one built using the "strong focusing" principle, the new machine is now operating at 575,000,000 electron volts.

AERONAUTICS

Supersonic Delta Wing Fighter Being Tested

See Front Cover

➤ AN IMPROVED model of the nation's first supersonic delta wing jet fighter, the YF-102A, is now undergoing flight tests and according to the Air Force will soon become part of the country's air defense.

The first picture of the plane in flight is shown on the cover of this week's SCIENCE NEWS LETTER.

The all-weather day and night fighter, designed by Convair, has a 37-foot wingspan and is 52 and a half feet long.

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TECHNOLOGY

German Fair Sees Electronic Juggler

➤ EVEN A juggler can be replaced by a machine.

While its more serious cousins grind out answers to the ponderous problems of physicists and mathematicians, an electronic "brain," made in the U.S.A., is adding some vaudeville color at the German Industries Fair at Hanover, Germany (April 24-May 3).

The "electronic juggler" quivers, jiggles and jumps until the attached servo-mechanism gives the cue that the three-foot steel rod the "juggler" holds is in perfect balance. He is then ready to begin his "act."

The juggler stands holding the rod in perfect balance without support or connective device of any kind. It can keep this up indefinitely.

Engineers point out that this demonstration of the continuous juggling symbolizes the ability of the computer to perform other automatic control feats for industry. Such devices may free human workers of the future from many tedious and repetitive tasks in the "push-button" factories of the future.

The electronic juggler was designed by Reeves Instrument Corporation, New York, and is part of the U. S. Department of Commerce's exhibit.

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GENERAL SCIENCE

Einstein and Gravitation

Before he died at age 76, the great scientist, whose theories revolutionized concept of the universe, was perfecting his work aimed at unifying atomic and stellar phenomena.

➤ PROF. ALBERT Einstein was working to perfect his generalized theory of gravitation, which aims at a complete description of the physical universe by a single theory, before his death at the age of 76 on April 18 in Princeton, N. J.

Einstein believed that his theory holds the key to the universe, unifying in one concept the tiny world of the atom and the vast reaches of star-filled space. Just as in 1905 his mathematical equations pointed out that light and mass were two different manifestations of energy, so he had tried mathematically to join gravitational and electromagnetic forces. These, he believed, are also simply two different manifestations of the unified cosmic field.

The equivalence of mass and energy has since been demonstrated many times in the blinding glare of atomic and hydrogen bomb explosions.

Mathematical difficulties have so far prevented checking the latest version of Einstein's generalized theory against known experimental facts. Einstein believed, however, that this unified field theory would eventually yield an explanation of the "atomistic character of energy."

As far as is known at this time, Einstein left no unpublished papers.

His first general theory of relativity was formulated in 1915. The first generalized theory of gravitation was published in 1950. Einstein revised it in 1953, and again in 1954.

Instead of the well-ordered universe that would follow from Einstein's field theory, most physicists today favor a particle theory, holding that the probability and uncertainty laws covering an electron's behavior must also apply to the universe.

Development of a single theory to explain both gratitational and electromagnetic forces has been a major goal of physicists since 1920. Although a vast store of knowledge about both atoms and galaxies has been built up since then, no single theory has previously been able to explain and describe it all.

In 1905 Einstein published his famous special theory of relativity, which set forth the equivalence of mass and energy and led to the well known equation, $E = mc^2$, or energy equals mass times the square of the velocity of light.

The world will have to wait to see if Einstein's generalized theory of gravitation will influence the present half century as profoundly as his theory of relativity did the first half.

Einstein was awarded the Nobel Prize in Physics in 1921. He came to the United States in 1933 and had been a member of the Institute for Advanced Study since then.

Einstein's brain and other vital organs were removed for scientific study before his body was cremated on April 18, the day he died. Before his brain is dissected and its internal structure studied, it will be measured and observations of the outside will be made.

Scientists point out that it is difficult to find the distinctive signs of genius in a lifeless brain. The difference would appear to be a matter of how the brain functioned in life rather than its size, weight or structure.

Similarly, it is not the size of a man's head that is important, but what goes on inside it. The frontal lobes of the brain are generally thought to be more closely linked with higher intelligence than are other parts which control senses and movement.

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MORE EFFICIENT BATTERY — The solar battery has reached an 11% efficiency in converting the sun's rays to electricity, double its original efficiency (See SNL, May 1, 1954, p. 278). Bell Telephone Laboratories scientist tests a modern version.

AERONAUTICS

New 180-Mile Rocket

➤ A NEW research rocket designed to carry 150 pounds of scientific instruments 180 miles into the air at one shot was revealed by John W. Townsend Jr. of the Naval Research Laboratory, Washington, D. C. The 180-mile altitude is expected to set a record high for a single stage rocket.

Twenty-two of these Aerobee-Hi rockets will be fired at Fort Churchill, Canada, during the International Geophysical Year in 1957-58, Mr. Townsend told the American Rocket Society meeting in Baltimore. Their cost is only one-tenth that of large Viking rockets.

The Aerobee-Hi rockets will be pressure-sealed so that samples of air taken high in the atmosphere will not be contaminated by gases leaking out of the rocket. Such leakage, Mr. Townsend said, has spoiled all measurements of this kind from Viking rockets, since they were literally flying in a cloud of their own gas. Air escaping from instruments and gases from violently boiling liquids make the gas cloud around the rocket.

Besides the Aerobee-Hi and the Viking, Mr. Townsend also described the V-2, the Wac Corporal, the Aerobee and the Rockoon. The new research rocket is now under development.

R. B. Snodgrass, also of the Naval Research Laboratory, reported in-flight temperatures from the Viking 10 rocket measured slightly over 300 degrees Fahrenheit at Mach number 5.8, or just under six times the speed of sound at that altitude. This temperature is about what would be expected, Mr. Snodgrass said.

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MEDICINE

Link Between Cancer And Virus Discovered

➤ THE STRONGEST link yet between viruses and human cancer has been reported by a pathologist in the University of California School of Medicine.

Dr. Warren Bostick has obtained from cancer tissue an infectious agent that causes a fatal virus disease in baby mice.

The cancer is Hodgkin's disease which has long been suspected to be of virus origin. This is the first time it has been possible, however, to cause infections in animals with Hodgkin's extracts.

Dr. Bostick probably succeeded in inducing infections in the animals because he used baby mice. Newborn animals are highly susceptible to infection and they gain resistance as they age. Failures in the past may have been due to use of adult animals.

The virus is now being grown in tissue culture and antibiotics, vaccines and antisera will be tested against it to see if the fatal infections of mice can be combatted.

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MEDICINE

Male to Female Change

Doctors find that ovaries can convert male hormone to female hormone. This may explain why hormone treatment for breast cancer fails in some women.

➤ WOMEN'S GLANDS can make a male to female transformation. The transformation consists in changing the chemical make-up of the male hormone, converting it into female hormone.

This discovery, with implications for cancer treatment, was made by Drs. Ralph I. Dorfman and Kenneth Savard of the Worcester Foundation for Experimental Biology, Shrewsbury, Mass., and Drs. Lewis L. Engel and Billy Baggett of Massachusetts General Hospital, Boston.

The reason for some failures in hormone treatment of cancer is partly explained by the new finding. Heretofore, doctors have injected male hormone into women to check cancer of the breast and cancer of the uterus. The theory was that the male hormone would antagonize the female hormone in the woman's body and keep it from stimulating further growth of the cancer. The results, however, were unpredictable. Sometimes the male hormone treatment seemed to speed the cancer's growth instead of checking it.

In such cases, it now appears, the ovaries in the woman's body were converting the male hormone into female hormone, thus increasing the supply of that hormone. This bears out a theory of the late Dr. Ira T. Nathanson of Massachusetts General Hospital, pioneer in hormone treatment for breast cancer.

Few scientists have believed that the human body could convert the male hormone into female hormone. The Worcester and Boston scientists showed that it is possible by experiments in which radioactive carbon was incorporated in the male hormone, testosterone. This was incubated with a human ovary kept alive in a glass dish. When the scientists purified and analyzed the product of the ovary by countercurrent distribution methods they found that the radioactivity had been incorporated into the principal female hormone of the ovary, estradiol.

The conversion required removing a methyl group from the 19th position on the male molecule and altering the bonds of the first of four carbon rings in its chemical structure.

Scientists have long known that the ovaries produce a little male hormone along with female hormone and that the male sex glands produce a little female hormone with male hormone.

But this is not the same as the chemical transformation announced.

Other glands, ovaries and adrenals from normal women and from those with various kinds of cancer, now are being incubated with a variety of hormones and other materials, and their products are being analyzed.

Announcement of the findings was made by the American Cancer Society which supported the research.

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MEDICINE

Isolate Gout Enzyme And Explode Old Idea

➤ ISOLATION IN pure form of an enzyme chemical involved in gout and explosion of an old idea about how it works were announced at the opening meeting of the Federation of American Societies for Experimental Biology in San Francisco.

The enzyme chemical is called uricase. Lack of it prevents the human body from breaking down uric acid crystals that form in the joints of certain susceptible persons, making them subject to attacks of gout.

Most animal species produce uricase naturally and do not get gout. They are capable of breaking uric acid down into allantoin, which is found in animal urine. Humans excrete uric acid because they do not have the enzyme to break it down.

The old idea that the enzyme is solely responsible for breaking down uric acid to allantoin is the one exploded by the new studies. The enzyme plays a part in this body chemistry, but it forms a substance named ureido alloxan from uric acid. Alloxan is found in the blood and urine of humans with certain abnormalties.

The studies reported were made by Prof. Henry R. Mahler, Harold Baum, Georg Huebscher and Germille Colmano of the University of Wisconsin's Institute for Enzyme Research, Madison, Wis.

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MEDICINE

450 Trained to Make Artificial Limbs

➤ MORE THAN 450 technicians from all parts of the United States were taught the latest techniques of making and fitting artificial limbs in a two-year training program now concluded at the prosthetics training center of the University of California.

The program acquainted orthopedists, therapists and artificial limb makers with results of an intensive artificial arm research program carried on at U.C.L.A. since 1945. It was a collaborative effort with the Veterans Administration and the National Research Council.

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TECHNOLOGY

Automatic Plating Plant To Test New Coatings

➤ RESEARCHERS WILL study the merits of a thin nickel coating for cans in the world's first automatic pilot plating plant.

The plant is part of a new laboratory built by the Bayonne Research Laboratory of the International Nickel Company, Inc., to test plating processes under factory conditions.

The automatic equipment can be operated entirely from a central panel board where time, current and voltage for each stage in the process are observed and controlled.

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ANTHROPOLOGY

Uric Acid Built Up Brain?

New theory holds that a lack in man's body chemistry causes accumulation of brain stimulant, and this gave him an evolutionary push toward a larger brain.

➤ MAN OWES his superior brain to a lack in his body's chemical factory, Dr. E. Orowan of Massachusetts Institute of Technology has reported.

The "pressure-of-life" diseases, such as high blood pressure, stomach ulcers and mental breakdowns, may be due to this same chemical situation, Dr. Orowan suggested.

The chemical factory lack lets a powerful brain stimulant, uric acid, pile up in the blood of man. Though not as strong a stimulant as those in tea and coffee, it is strong enough, Dr. Orowan said, so that its effect over a million years of man's evolutionary development could produce man's superior brain.

Mammals are distinguished from other vertebrates and from insects by their ability to produce the enzyme uricase which oxidizes uric acid and helps to turn it into allantoin.

Among the mammals, only man in company with the higher apes is unable to manufacture uricase in the body. Uric acid is therefore found as a waste product in the urine of man.

Crystals of uric acid sometimes accumulate in the joints of some susceptible persons. This causes them to have gout.

Man, who eats a good deal of meat but who lacks uricase to help him get rid of the uric acid produced by the meat, is constantly under the influence of this powerful brain stimulant, Dr. Orowan said in reporting his conclusions to *Nature* (April 16).

This circumstance may have played a decisive part in the intellectual development of the apes and man.

It may also have led to the "pressure-of-life" diseases which Dr. Orowan thinks might better be called "pressure of uric acid" diseases. He points out that the stimulating uric acid can be more powerful than tea and coffee chemicals in preventing rest and recovery from work because its action extends over day and night. Since the populations of highly industrialized areas are big meat consumers, the consequent piling up of uric acid in the blood may account for "pressure-of-life" diseases being more frequent among them.

A mutation acting on the associative mechanism of the brain would not be likely alone to account for the momentous brain development in the evolution of man, Dr. Orowan explained.

The selective value of such a mutation would be very small unless the animal uses its brain even when it is not urgently necessary.

Such a tendency is very unusual in animals. Even modern man has, in general, "no irresistible addiction to mental work," he commented. Such a mutation would have little chance to become established in the species unless its selective value were strongly enhanced by a brain stimulant such as uric acid.

Millions of the present generation, Dr. Orowan pointed out, owe their careers and some their lives to caffeine or theobromine taken while cramming for an examination or during a long automobile drive.

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PUBLIC SAFETY

Heat or Cold Increases Danger of Radiation

➤ MIDSUMMER AND midwinter would be the worst times here in the United States for survival from the radiation of any future attack by A bombs, H bombs or other nuclear weapons.

Studies suggesting this were reported to the Federation of American Societies for Experimental Biology in San Francisco by Dr. John Doull and Andrew Hasegawa of the University of Chicago's Air Force Radiation Laboratory.

Rats exposed to killing doses of X-rays and then placed in artificial climates of 100 degrees Fahrenheit temperature and 50% humidity survived only 60% as long as rats living under normal experimental conditions.

The "hot room" rats survived for an average of six days, the other irradiated rats for an average of ten. Rats given lower, but still dangerous, doses of irradiation also survived for shorter periods of time and lost more weight than rats merely exposed to irradiation and not to the hot environment.

Six days after exposure to the radiation, the "hot-room" irradiated rats began to show an increase in body temperature. This fever did not develop in rats exposed to either heat or irradiation alone.

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MEDICINE

U. S. Uranium Miners Escaping Lung Cancer

➤ SO FAR as can be learned now, uranium miners in the Colorado Plateau will escape the lung cancers that killed so many European miners working with similar sources of radioactivity.

After five years of study of the hazards, no conclusive proofs could be found as yet that the internal alpha radiation, ever-present in these mines, is a causative agent in lung cancer, J. D. Torrey, industrial hygienist, and P. W. Jacoe, chief of the environmental health services of the Colorado State Department of Health, declared at the Industrial Health Conference in Buffalo, N. Y.

"We do not anticipate a duplication of the European experience because we have a more complete understanding of the problems and of the steps that are necessary to reduce the exposure of men to these hazards," they stated.

Hazards in these mines in addition to internal alpha radiation are dust, uranium and vanadium as metals, miscellaneous hazards, such as fumes from diesel-operated equipment, and the combination of all four. The most economical way to control the hazards, they said, is by well-planned ventilation.

"Each mine, however, offers a unique problem from the engineering standpoint," they stated. "The problems are multiplied because of geographical location, lack of water, lack of electrical power, and many other shortages. Furthermore, the average number of workers per mine is three to four. Any mine employing 10 people is a large mine, and those employing over 25 can be counted on your fingers."

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PSYCHOLOGY

Reaction to Stress Is Linked to Disorders

➤ THE BODY has its own pattern for responding when faced with an unusual stress. This is tied up with tendency toward particular kinds of physiological disorders.

Dr. Peter M. Lewinsohn of Johns Hopkins University told the Eastern Psychological Association in Philadelphia what happened when three groups of people were put into two situations of stress.

In one, each individual had to plunge his feet into near freezing water. For the other situation, while taking a mental test, each was told repeatedly that he was failing and was "punished" by electric shocks on his leg.

A group consisting of duodenal ulcer patients responded with an increase in parasympathetic nervous activity. The flow of saliva under stress was higher for this group than for any other.

A group of patients with high blood pressure (essential hypertension) responded with an increase of sympathetic nervous activity.

For a third group, reaction to stress involved an increase in muscular tension. This group was very tense to start with, was restless and had trembling of the fingers.

An increase in tremor of the fingers developed under stress, and it affected all groups. The cold water test produced the greater increase.

Being badgered with "failure" produced a greater rise in heart rate than did cold.

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GENERAL SCIENCE

Oath for One Out of Five

An estimated 12,600,000 persons in the United States have taken the loyalty oath or have been cleared for security as one of the conditions for their employment.

➤ ONE PERSON out of five in the United States has either taken a loyalty oath or been cleared for security as a condition of his employment, Prof. Ralph S. Brown Jr. of Yale University's Law School reported.

His views on how widely security and loyalty programs, both in government and private industry, affect every citizen in the country are outlined in a special issue of the *Bulletin of the Atomic Scientists* (April) devoted to analyzing the impact of these policies.

Taking the total labor force as 62,000,000, Prof. Brown estimates that 12,600,000 have "taken a test oath, or completed a loyalty statement, or survived some undefined private scrutiny." Resulting dismissals are less than one-tenth of one percent, he calculates, representing a "shocking waste of resources," since thousands are engaged in administering the security programs.

"It would not be at all surprising if the hunters should turn out to be more numerous than the quarry," Prof. Brown concludes.

Security-loyalty policies affect every major aspect of national life, from cutting down on competitive free enterprise to foreign policy. All authors of the 15 articles in the issue make suggestions for improving these programs, but not dismantling or discarding them.

The United States needs "to make secure what needs to be secure for the progress of national military strength and to let all else go free," Edward Shils, professor in the Committee on Social Thought at the University of Chicago, believes. Although there should be changes in existing security requirements, he says, the problem will be solved by a restoration of national self-confidence and common sense.

J. G. Beckerley, director of classification for the Atomic Energy Commission from 1949 to 1954, charges that competition in private industry is a fiction in the field of atomic energy. This lack of competition, he says, tends to spread into many other industries as the scope of government controls over information and security widens.

If private industry is to flourish, the present trend toward over-classification of information and more stringent control of personnel must be reversed. Mr. Beckerley is now a physicist with the Schlumberger Well Survey Corporation in Ridgefield, Conn.

How the Atomic Energy Commission has dealt with security problems since its foundation is related by John G. Palfrey, professor of law at Columbia University. In its early days, the agency learned to recognize the balance between security by concealment and security by achievement.

More recently, it kept the "superstructure of its security system intact, but abandoned its moorings, and the system foundered." Most glaring example of this was the AEC's withdrawal of security clearance from Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study, Princeton, N. J.

This case, Prof. Palfrey says, when viewed against the background of earlier AEC practices, leads to the conclusion that "almost everything of importance" accomplished until then had been discarded.

Case histories of several scientists who have had difficulties under the present system are presented by the Scientists' Committee on Loyalty and Security, with headquarters in New Haven, Conn. Concerning the Fort Monmouth Laboratories, they conclude that "whatever gains were made by the elimination of doubtful personnel were overwhelmingly offset by a decline in the effectiveness" of the laboratories.

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MEDICINE

Lung Cancers More Easily Transplanted

➤ HUMAN LUNG cancers can be more successfully transplanted to laboratory animals than other kinds of human cancers, Drs. Edward T. Krementz and Joseph A. Spedale of Tulane University School of Medicine, New Orleans, reported at the meeting of the American Association for Cancer Research in San Francisco.

Successful transplants of lung cancers occurred in 27.3% of the attempts, compared to 3.4% for breast cancers.

The fact that patient salvage from this disease is so poor, and the fact that the number of successful transfers is high by comparison with other cancers may, it was pointed out, indicate a significant characteristic of behavior existing in carcinoma of the lung.

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MEDICINE

Hydrocortisone Helps Hay Fever, Skin Trouble

➤ RUNNING, STUFFY noses of hay-fever patients can be relieved by a nasal spray containing hydrocortisone, relative of the famous anti-arthritis drug, cortisone.

Good results in 86 out of 100 patients were reported by Drs. John H. Burger and Joseph H. Shaffer of the Henry Ford Hospital, Detroit, at a New York Academy of Sciences conference in New York.

Unfortunately, patients have to go on using the medicine, since symptoms return within a week or two after stopping the hydrocortisone spray. Fortunately, however, the hydrocortisone is apparently not absorbed into the blood stream through the nose, so there are no side effects to limit the time that it can be taken in the nasal spray.

An ointment of hydrocortisone has given such good results in treatment of eczema in babies and other stubborn skin troubles that Dr. Victor H. Witten of New York University-Bellevue Medical Center, New York, told the conference it is "one of the most important recent additions to the list of topical medications for use in the treatment of diseases of the skin."

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***PURIFYING TITANIUM** — Enclosed in inert gas, a bar of titanium is shown being purified by a new method, called cage zone refining. As the bar is melted progressively from one end to the other, the iron impurities tend to remain behind in this method developed by Westinghouse Electric Corporation.*

CHEMISTRY

Anti-Blood Clotting Chemical From Seaweed

➤ KELP, A kind of seaweed, has furnished the basic material for synthesis of a new chemical to keep blood from clotting. Although not yet available commercially, this new chemical promises to be a relatively cheap medicine for such dangerous clotting conditions as thrombosis in which blood clots in veins.

The new chemical was synthesized by scientists at the Canadian National Research Council's Maritime Regional Laboratory in Halifax, N.S.

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OCEANOGRAPHY

Magnetic Rock From Sky

➤ ROUGHLY 7,000,000,000 mysterious particles from outer space bombard the earth each year. This was revealed from studies made of the ocean bottom.

More than 300 of the odd magnetic particles were swept from 45,000 square miles of ocean floor by a home-made magnetic rake during the Danish Deep-Sea Expedition in 1950-52. They have been named caudaites to distinguish them from meteorites and cosmic dust.

The particles are believed to originate from the tails of the larger cosmic bodies that enter the earth's atmosphere.

Varying in color from grayish-brown to shining black, the caudaites are nearly all spheres. They measure less than one-half millimeter in diameter. Upon examination, scientists found that some of them consist wholly of magnetite.

Others have a silicate groundmass loaded with magnetite crystals. They also found that nearly all the particles had spherical cavities. Altogether, seven metallic particles were found in the material studied.

Support of the theory that the particles come from outer space involves several factors.

The structure and composition of the metallic particles indicate that their formation requires high heat and rapid cooling.

No comparable particle formation has been found to occur naturally on land.

A comparison of the particles with iron meteorites was made from similar particles found in an 1872-76 expedition and showed that all the material found in the particles is also found in stony meteorites.

Other particles found by a Swedish expedition from deep borings into the sea bottom rule out artificial origins.

The scientists reporting the cosmic particles estimated that the total weight of the 7,000,000,000 particles falling on the earth each year would be about 30 tons.

A complete description of the magnetic particles was reported to the British scientific journal *Deep-Sea Research* (1955, Vol. 2) by Anton Fr. Bruun of the Zoological Museum, Copenhagen, Ebbe Langer of the department of metallurgy, Copenhagen Technical University, and Hans Pauly of the Mineralogical Department of the Kryolitselskabet Oresund, Copenhagen, Denmark.

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MEDICINE

May Transplant Heart

➤ THERE IS hope, now, that human hearts can in the future be transplanted, Dr. Charles A. Hufnagel of Georgetown University, Washington, D. C., declared at the meeting of the Kentucky Academy of General Practice in Louisville, Ky.

The hope comes from present success in replacing worn or damaged arteries and other blood vessels with ones transplanted from the dead or from animals or with plastic vessels.

About half the victims of hardened arteries can be given relief through such substitute blood vessels, Dr. Hufnagel said. In general, the larger the vessel the more chance of success. In the tiny vessels, with bores six-hundredths of an inch or less, "we seem to reach a point beyond which success declines sharply because of technical problems," Dr. Hufnagel finds.

Plastic tubes, up to eight inches in length, are substituted for large arteries when they become clogged or blocked. When smaller vessels are involved, the surgeons prefer to use arteries taken from animals, or from human cadavers. Successful transplants up to 20 inches in length have been obtained.

When an animal or human artery is planted in a living person, it is dead. But it provides a framework around which new cells form, and contains blood flow while the building process is going on.

Successful artery transplants and implants are most frequent when atherosclerosis, a buildup of clogging material inside the vessel, is at an early stage. Dr. Hufnagel said much of the success he reported was due to early recognition of the condition by family doctors in their periodic checkups.

The transplant and implant techniques are also used for artery aneurysms, in which a section of artery wall becomes weak and threatens to burst like a toy balloon.

Dr. Hufnagel is the inventor of a substitute heart valve, a plastic ball that controls blood flow when inserted into the heart's main artery.

Science News Letter, April 30, 1955

CHEMISTRY

New Manganese Isotope Fills Gap in List

➤ ONE OF the last gaps in the middle of the list of radioactive forms of common metals has been filled by the identification of manganese 53.

Found in a sample of chromium bombarded by protons, the necessary timing studies to establish the half-life of 140 years for the new isotope were carried on by Joseph R. Wilkinson, graduate student at the Florida State University, working with Dr. Raymond K. Sheline, associate professor of chemistry.

More than two and a half years have been spent measuring the half-life by means of Geiger counters. Theory had predicted a long-lived form of manganese for this particular place in the list of isotopes, which has been a blank up to the time of the present discovery. Part of the work now reported by Mr. Wilkinson and Dr. Sheline was to make sure that no short-lived radioactivity would be present in the irradiated sample to confuse the results.

The new isotope could be used to follow changes in manganese-containing iron, due to wear or to shift in crystalline structure due to age, Dr. Sheline and Mr. Wilkinson stated.

Science News Letter, April 30, 1955

MEDICINE

Drug Speeds Recovery From Leg Inflammation

➤ RECOVERY FROM thrombophlebitis and other inflammatory conditions can be speeded and many patients spared going to a hospital by use of a drug called Parenzyme, Dr. Bert Seligman of Flower Hospital, Toledo, Ohio, reported at the meeting of the Kentucky Academy of General Practice in Louisville, Ky.

This drug is a preparation of highly purified trypsin in sesame oil. Trypsin is an enzyme chemical believed to make body tissue more permeable so that the cells and liquid forming the reddened swelling in inflammations can disperse.

Thrombophlebitis is a combination of inflammation and clotting of blood in blood vessels. It usually attacks a leg. Dr. Seligman said that with the trypsin preparation he can treat about half his thrombophlebitis patients in the office rather than a hospital and that patients in the hospital are confined only about half as long as with conventional treatment.

Science News Letter, April 30, 1955

MEDICINE

Patients Think as Well With Only Half Brain

➤ CUTTING OUT half the brain of mentally retarded patients caused no loss in intelligence or marked change in personality, Dr. Alexander Tolor and Adam Munz of Columbia-Presbyterian Medical Center, New York, told the meeting of the Eastern Psychological Association in Philadelphia.

In fact, loss of half the brain resulted in a slight gain in I.Q., the scientists found.

The drastic operation was resorted to because the patients—two girls and a boy—had for a long time had uncontrollable seizures and paralysis of one side of the body. They were severely retarded mentally and had behavior difficulties.

The patients, after the operation, did seem to be more aware of being disabled and sick, and they were more depressed.

Science News Letter, April 16, 1955

Magnesium weighs less than two-thirds as much as equal volumes of aluminum and about one-fourth as much as steel.

MEDICINE

Heart Beat Can Restart After Several Hours

➤ HEARTS THAT have stopped dead for several hours can be made to beat again, Dr. Theodore R. Sherrod of the University of Illinois College of Medicine, Chicago, reported at the meeting of the Federation of American Societies for Experimental Biology in San Francisco.

The essential chemical machinery for starting the heart beat seems to remain intact even after several hours of no beating, Dr. Sherrod said.

He kept rabbit hearts beating outside the body for one or two hours by using oxygen and a fluid containing the essential minerals found in the blood. Then he let the hearts "die" and remain inactive for one to two hours.

Then a fluid containing a heart stimulant, either serotonin or ouabain, was used, and the hearts began to beat again. Serotonin, normally found in the body, appears to be especially effective in keeping the heart beating normally as long as six hours.

The strength of the beat of the restored heart was as strong as, if not stronger than, the beat of the heart before arrest, Dr. Sherrod said. Responses of the heart to temperature changes, depressants and stimulants were identical to that seen before the heart was allowed to die.

Science News Letter, April 30, 1955

CHEMISTRY

New Poison Ivy Poison Causes Albino Cells

➤ A NEW plant growth regulator which promises to wipe out poison ivy and other pest plants can be recognized by the white growth tips of the plants to which it has been applied.

Known chemically as 3-amino-1,2,4-triazole, the new compound can also be used as a defoliant for cotton plants, to help in harvesting cotton by machine. Experiments with the chemical were reported by Dr. Kenneth A. Sund of American Cyanamid Co., Stamford, Conn., before the division of agricultural and food chemistry of the American Chemical Society in Cincinnati.

Whether sprayed on the plant or mixed into the ground, the triazole compound is taken up by either leaves or roots and carried to the parts of the plant where most rapid growth is taking place. Dr. Sund discussed the particular reactions which bleach the green cells at these sites, causing albinism in the plant.

So many weed control chemicals have been described in recent years that one session of the chemical meeting was devoted to exchange of information on the best ways to keep up with the announcements of them in scientific literature.

Insecticides related in structure to the "nerve gases" developed during World War II have been increased in number by chemical rearrangement of similar organic compounds, as reported by Dr. W. F. Barthel of the U. S. Department of Agriculture at the meeting.

A new phosphorus chemical for control of the housefly was reported by Dr. F. A. Gunther of the University of California Citrus Experiment Station, Riverside, Calif. This substance is called Diazinon, a shortened form of its 25-syllable chemical name. Methods were reported to chemists for its determination in milk, to make sure that its use to kill flies in dairy barns does not result in any contamination of the milk supply.

Science News Letter, April 30, 1955

ASTRONOMY

Comet Discovered Near Big Dipper

➤ A FAINT comet near the Big Dipper has been discovered by Dr. George O. Abell of Mount Wilson and Palomar Observatories in California.

The new stellar object is of 15th magnitude, too faint to be seen without a large telescope. It is located near the last star in the Big Dipper's handle and is moving south and west toward the spiral galaxy, M-51, which is visible with a small telescope. M-51 is almost directly overhead at midnight.

The comet is in the constellation of Canes Venatici, the hunting dogs. It was spotted on a photograph taken April 13 with the 48-inch Schmidt telescope as part of the National Geographic Society-Palomar Observatory sky survey.

Dr. Abell was co-discoverer with Robert G. Harrington, also of Mount Wilson and Palomar Observatories, of another, fainter comet (see SNL April 9, p. 237). Details of the new comet's discovery were sent to astronomical observatories by Harvard College Observatory in Cambridge, Mass., clearing house for astronomical information in the Western Hemisphere.

Science News Letter, April 30, 1955

ANTHROPOLOGY

African Ape-Men Show How Man Became Biped

➤ THE AUSTRALOPITHECINES, or South African ape-men, were definitely not human. But their bones provide new evidence on how man first came to walk on two feet.

This conclusion was reported by Dr. F. Clark Howell, Washington University School of Medicine, St. Louis, to the American Association of Physical Anthropologists meeting in Philadelphia.

Australopithecus, earliest of the ape-men, who lived in early Pleistocene times, had a fairly erect posture and true two-footed walk, Dr. Howell found from a study of their pelvic bones. But these creatures lacked a number of human features in their bones.

Science News Letter, April 30, 1955

IN SCIEN

MEDICINE

Antidote to Radiation Sickness Coming Closer

➤ SCIENTISTS ARE coming closer to having a specific medicine for radiation sickness. The latest step was reported by Leonard J. Cole and Marie E. Ellis of the U. S. Naval Radiological Defense Laboratory in San Francisco at the meeting of the Federation of American Societies for Experimental Biology in that city.

The progress is still in the laboratory mouse protection state. It consists in separation from mouse spleen of a chemical which saves immature mice from death by ordinarily lethal doses of radiation.

The chemical has properties which place it in the class of biologically important substances termed desoxyribonucleoproteins, the Navy scientists explained. The substances are giant molecules which are found exclusively in the chromosomes and appear to be the carriers of cell heredity. Although the isolated fraction is not completely cell-free, the experimental results indicate that the protective effect of the fraction is due to the nucleoprotein and not to the cells.

Science News Letter, April 30, 1955

MEDICINE

Anti-Rheumatic Drug Produced in Body

➤ NEW DRUG for gout and rheumatoid arthritis is a chemical produced by the body itself. It is called G-27202 and is now being made synthetically.

Discovery of this new anti-rheumatic drug was announced by Drs. Bernard B. Brodie and J. J. Burns of the National Heart Institute, Bethesda, Md., at the meeting of the Federation of American Societies for Experimental Biology in San Francisco. Collaborating with them were Drs. Alexander B. Gutman, T. S. Yu, Bruce Paton, J. Murray Steele and Mr. James Perel of Goldwater and Mt. Sinai Hospitals, New York City.

Preliminary tests at the National Heart Institute show the new drug may be effective. It is a by-product of the body's attempt to break down another, highly effective anti-rheumatic drug, phenylbutazone.

Such a by-product of the body's attempt to modify a drug is known as a drug metabolite. Rarely, say the scientists, does the body provide a drug metabolite as active and potentially valuable as this new phenylbutazone derivative.

Phenylbutazone itself unfortunately has undesirable side effects in some individuals. Only extended clinical testing of the new compound will reveal whether or not it has inherited the side effects of phenylbutazone.

Science News Letter, April 30, 1955

CE FIELDS

AGRICULTURE

Pest Losses 30 Times Chemical Control Costs

➤ DISEASES, INSECTS and weeds cost the farmer more than 30 times as much money each year as he pays out for chemical controls.

The three pests are responsible for an estimated annual loss of more than $7,500,000,000. The farmer, on the other hand, spends only $241,000,000 each year to combat them with chemicals.

The annual crop pest ledger was compiled by the U. S. Department of Agriculture from more than 23,500 farmers, queried in a nation-wide survey. In addition to the totals, the survey also showed:

1. Only one-sixth of the nation's cropland is treated.

2. Farmers treated as many acres for weed control, 31,000,000, as they did for both insects and diseases, 29,000,000. Duplication was found in less than 3,000,000 of the treated acres.

3. Of the $241,000,000 spent, $193,000,000 went for insect and disease control and the remainder for weeds. This does not include cost and up-keep of farm control equipment, nor seed treatment, control of rats, mice and insects in stored grains, soil fumigation or insecticides mixed with fertilizers.

4. Farmers do most of their own spraying. Six times bigger than before the Second World War, production of sprayers and dusters is now a $35,000,000 a year industry.

5. The frequency of chemical use varies with purpose, with crops and other factors but, nationally, one application is made per season for weed control and three for insects and diseases. Potatoes get more treatments than any other crop: five per season.

A full report of the survey was made in *Agricultural Research* (April).

Science News Letter, April 30, 1955

BOTANY

American Plants Reached China in 16th Century

➤ THREE AMERICAN plants—the peanut, the sweet potato and corn—have a long history in China but they were not introduced there until after America's discovery by Columbus.

Historical evidence to settle the recent dispute over whether these plants might have been introduced through pre-Columbian contacts between America and the East was presented by historian Dr. Ping-Ti Ho of the University of British Columbia, Canada, in the *American Anthropologist* (April).

The peanut, known in China by the descriptive name "seeds born from flowers fallen to the ground," was introduced into China early in the sixteenth century by way of the sea, this investigator found. It was taken there either by the Portuguese or by Chinese merchants of the South Sea Islands.

Date for the introduction of the sweet potato was probably "several decades" before the year 1594. In that year there was a widespread crop failure in Fukien. The governor, Chin Hsueh-tseng, issued pamphlets on methods of cultivation of the chin-shu, golden tuber, and urged its extensive cultivation to stave off famine.

Corn was also first introduced in early post-Columbian days. Then, as today, it was not welcome among the people of the southeast coast. It was grown first in the mountainous regions of the southwest, still partially inhabited by aborigines. Corn made its first appearance in Peking as tribute paid by western tribesmen sometime before the middle of the sixteenth century.

Science News Letter, April 30, 1955

PSYCHOLOGY

Waiting for Dentist Lowers Learning

➤ ALTHOUGH PATIENTS in a dentist's waiting room, waiting their turn to have their teeth worked on, frequently browse through the ancient magazines on the table, it is unlikely that they learn much from their reading.

The "intelligent functioning" of children deteriorated while waiting to see the dentist. The field of perception narrowed and opportunity for new perceptions or learning decreased, it was shown by tests.

This dulling effect of the threat of the dentist was reported by Dr. Virginia I. Shipman of Pennsylvania State University to the Eastern Psychological Association in Philadelphia.

Science News Letter, April 30, 1955

MEDICINE

Cough Puts Squeeze on Blood Supply to Brain

➤ COUGHING PUTS the squeeze on blood vessels in the chest and brain. When the squeeze is sudden enough and intense enough, the brain may be almost bloodless.

This explanation of the mechanics by which coughing can make a person faint was given by Drs. James V. Warren, Henry D. McIntosh and E. Harvey Estes of Duke Medical School and the Veterans Administration Hospital, Durham, N. C., at the meeting of the Federation of American Societies for Experimental Biology in San Francisco.

Prolonged coughing, intense enough to produce fainting, reduced arterial blood pressure in the brain almost to zero for several seconds, the scientists found.

Coughing intense enough to cause fainting generally occurs in muscular men, who often develop violent coughing, the scientists pointed out.

Science News Letter, April 30, 1955

ASTRONOMY

Venus' Magnetic Pull Five Times Earth's

➤ VENUS HAS a magnetic field five times as strong as the earth's at a distance of about eight and a half million miles from both planets, Dr. J. Houtgast of Utrecht, The Netherlands, has estimated.

Although scientists have speculated for years about the possibility of a magnetic field for earth's sister planet, Dr. Houtgast is the first to suggest its numerical value. His estimate is based on the marked drop in magnetic activity "from seven days before to one day after" Venus comes between the sun and earth. He studied records of changes in the earth's magnetic activity covering the period 1884-1953, during which there were 44 times when Venus was lined up between the earth and sun.

At this time, the planet acts as a shield, deflecting some of the solar particles responsible for magnetic activity. If these particles move at 300 miles per second, then, Dr. Houtgast calculates, the magnetic field of Venus at about eight and a half million miles is less than two ten-billionths of an oersted, the unit of magnetic intensity.

At the same distance the earth's magnetic field is one-fifth this value, he reports in *Nature* (April 16). At the equator, the earth's field is three-tenths of an oersted, but decreases very rapidly with increasing distance from the earth.

Science News Letter, April 30, 1955

MEDICINE

Chemical "Fifth Column" Prepares Cells for Cancer

➤ APPARENTLY NORMAL cells may be invaded by a fast-working chemical "fifth column" which prepares them for invasions by cancer.

This is suggested in research on cancer of the cervix in the department of obstetrics and gynecology at the Medical Center of the University of California at Los Angeles.

Investigators have found that cervix cancer tissue will usually grow vigorously in tissue culture. But normal cervix tissue will grow with much difficulty or not at all.

It was also found that tissue which immediately surrounded the cancer and which appeared to be normal under the microscope grew extensively in tissue culture just as did the cancer cells.

This suggested that apparently normal cell changes, perhaps chemical in nature, may take place long before the cells themselves assume the appearance of cancer cells. These changes which may prepare the way for cancer, perhaps cause the apparently normal cells to grow in tissue culture in a manner similar to the cancer cells.

The tissue culture techniques may prove an effective aid in diagnosing cancer of the cervix in an early stage, the investigators hope.

Science News Letter, April 30, 1955

GENERAL SCIENCE

Fair Time for Science

Many thousands of youthful scientists exhibit their experimental projects in science fairs all over the country. Finalists of 65 of the larger fairs will go to the National Science Fair.

By WATSON DAVIS

➤ IT IS science fair time throughout the land! Many thousands of boys and girls who are members of science clubs in our nation's schools are climaxing a year's study and hobby fun with their exhibits.

"Come to the fair" is the invitation from these science club members when they exhibit their projects to their fellow students, teachers, parents, and the public.

Science fairs are now just as fundamentally a part of American life as are the county fairs that did so much to build our agriculture and industry.

The simplest fair is an exhibition of science projects held in the school itself. There are shown all the experiments, collections, and displays that have been worked out by students either in class or as extra-curricular science club activities. In this form only the pupils and the teacher see the exhibits; but enthusiasm soon spreads to make them a feature of a meeting or a showing to which parents and the public of the community are invited.

The exhibits considered most likely to compete favorably with those from other schools and clubs are sent to city-wide or area science fairs.

Local Cooperation

In holding a science fair in a locality, the schools, colleges, civic, scientific and technical societies, industries and newspapers usually cooperate. A teachers' committee takes the initiative and a newspaper, as part of its educational service to the community, often will sponsor it, assisting on the publicity, promotion, arrangements and financing.

Exhibitors in such fairs are rewarded by the stimulation of having their work shown and by receiving certificates indicating the impression their work made on the judges. Other awards, ranging from emblems to cash prizes and scholarships, are sometimes given.

A typical science fair will have several hundred exhibits, viewed by thousands of people who visit an exhibition hall which may be a school or college gymnasium, an armory, a museum, or other such area. Some science fairs, even in large cities, accept the maximum number of exhibits the hall will allow. In other cases, the city or area fair receives only an allotted number of exhibits from each school which holds its own eliminations first.

The exhibits are judged by committees of scientists, engineers, and other experts of the community, using rules adapted from judging standards now nationally approved.

From local fairs the best exhibits made by individual students (not groups), attending sophomore, junior or senior classes of any secondary school, are selected for entry into the annual National Science Fair, held in a different city each year, under the auspices of SCIENCE SERVICE and cooperating newspapers. Not more than two finalists, usually one boy and one girl, are selected and are sponsored to the National Science Fair.

This year more than 65 fairs, from Lancaster, N. H., to San Diego, Calif., are sending their finalists to the Sixth National Science Fair at Cleveland, May 12-14. There in a large hall more than 125 boys and girls will set up their exhibits to be judged by leading scientists and engineers. More than 40 awards of scientific apparatus, etc., worth over $2,000, that are wished for by the young scientists will be distributed.

The exhibits shown at the science fairs cover almost every subject under the sun. One boy built a television camera. Another combined a telescope and microscope. A lie detector was put to work as a demonstration.

There are always several high-voltage generators. Collections of plants, insects and rocks are made and displayed. The nervous reactions of rats and the migration of the cottontail rabbit were among the studies of animals. Radio control is put to work in several projects. Wind tunnels are built and operated.

Vitamins, drugs, enzymes, yeast and plants rival embryonic chicks and fruit flies as subjects for study. Chemical gardening or hydroponics makes a favorite exhibit.

SCIENCE SERVICE, Washington, D. C., is the national sponsor for Science Clubs of America and a teacher or other adult can affiliate a group without charge. Several publications suggest projects.

Science News Letter, April 30, 1955

• RADIO

Saturday, May 7, 1955, 5:00-5:15 p.m., EDT

"Adentures In Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Finalists of the Sixth National Science Fair will describe their projects, speaking from Yankton, S. Dak.; Oklahoma City, Okla.; Berkeley, Calif.; Knoxville, Tenn.; Minot, N. Dak.; Charleston, W. Va.; Phoenix, Ariz.

SCIENCE FAIR EXHIBIT — Young scientist shows what she can do in science fair exhibit. Beatrice Wood, 17, of Cleveland has extracted chlorophyll by chromatography, one of the latest chemical methods. Hers was one of the projects exhibited in last year's National Science Fair.

AERONAUTICS

Slower Landing for Jets

➤ THE NAVY is developing a series of high speed planes that can land in half the usual distance and take off with a 40% shorter run.

Patents for the system have been granted to John S. Attinello, head of the supersonic section of Navy's Bureau of Aeronautics, Washington, but details are still a military secret. The British are also working on their own adaptations of the scheme.

Though designed for speed, these planes will be able to float in for a landing at much slower speeds than are now possible. This has been a primary aim of designers of planes for aircraft carriers.

Air jets placed in front of the landing flaps in the wings make the difference, Mr. Attinello told SCIENCE SERVICE. The blowers give the plane added buoyancy by preventing the break-up of the smooth flow of air over the wing when the flap is lowered. Normally, detachment of the flow over the upper surface causes a reduction in lift, or stall.

The jets of gases, obtained from the engine, blow over the top of the landing flaps automatically when the plane prepares for a landing.

Called the Bureau of Aeronautics Supercirculation System, the development will add greater safety in take-off and landing operations and will allow shorter runways or increase the payload of planes flying from longer runways.

The system, he said, could be adapted for commercial aircraft.

A Navy jet trainer, the T2V-1, which uses this principle, is now being produced, and other models are under development.

The compressed gases for the wing blowers can be obtained from any of the three widely used types of engines, the turbojet, the turboprop and the conventional reciprocating engine.

The principle for the system, called "boundary layer control," was developed by the Navy in cooperation with Grumman Aircraft Engineering Corporation and Allison Division of General Motors Corporation.

Science News Letter, April 30, 1955

GENERAL SCIENCE

"Idea Bank" Is Created

➤ AN AGENCY of the Federal government has established an "idea bank" stocked with descriptions of products, inventions and commercial possibilities to aid the nation's small businesses.

Twenty-six such ideas, inventions and potential products were made public by the Small Business Administration, initiator of the new program. The list, which is to be published periodically, includes such devices as a modern abacus, an improved overhead garage door, a new type of charcoal barbecue broiler, and a telephone-holding device permitting free use of the hands.

In announcing the new service, Wendell B. Barnes, administrator of Small Business Administration, said, "One of the most urgent needs for small businesses is to keep up to date on production and marketing techniques. They need new or improved products and processes so they can diversify, expand and provide jobs."

The Small Business Administration does not endorse the products or processes it lists. It merely tries to introduce the man with an idea and no means of following through to the man with the means looking for an idea.

As part of the agency's products assistance program, both small businessmen and idea men can request or submit information at any of the Administration's 14 regional offices or 24 branch offices throughout the United States.

"I believe," Mr. Barnes said, "the Government can be of practical service to private industry in this field by marshaling in useful form information on both sides of the problem: ideas for new products and processes on the one side, and manufacturers seeking this information on the other side."

The list recently released to the public is the second of its kind. Earlier, the agency distributed a trial-balloon list in selected areas.

Science News Letter, April 30, 1955

MEDICINE

Less Dangerous Drug For Treating Leukemia

➤ A COMPOUND that may be superior to nitrogen mustard for the treatment of cancers such as leukemia and Hodgkin's disease has been synthesized at the University of California.

Experiments in mice indicate that the compound, a sulfur mustard, is less poisonous to the body system and has a more lasting effect.

The work was reported by Dr. David M. Greenberg, Berkeley biochemist, and his colleagues, Donald C. Morrison and Ethelda N. Sassenrath, to the meeting of the American Association for Cancer Research in San Francisco.

Dr. Greenberg said experiments showed that the action of the synthetic sulfur mustard against mouse tumors is parallel to that of nitrogen mustard. But it is only about one-tenth as toxic as nitrogen mustard —it took ten times as much of the new compound to kill mice.

In addition, the sulfur mustard appears to be more stable in the body than nitrogen mustard. A disadvantage of nitrogen mustard is that it apparently is broken down chemically in the body very rapidly, giving it only short-term action. The scientists found that regressions of mouse tumors last longer with the new compound than with nitrogen mustard.

The research was financed by the American Cancer Society, the U. S. Public Health Service and the University. It is a part of a program to create and screen new compounds with cancer-fighting potential.

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CHEMISTRY

New Process Makes 100 Octane for Future Autos

➤ A NEW refining process that gives gasolines of more than 100 octane for the future's high compression auto engines has been developed by the Universal Oil Products Company.

Called Rexforming, the process is an advance over the platinum catalytic refining method now in use called Platforming. In the new process, low octane fractions are separated from the gasolines flowing from the catalyst zone and retained in the system until completely converted into high octane product. This recycling process may be repeated several times. Feed for the new process may be straight run naphthas, straight run or cracked stocks or mixtures.

The process was announced to the Western Petroleum Refiners Association in San Antonio, Tex., by Henry W. Grote, Dr. Vladimir Haensel and Melvin J. Sterba.

Summer averages for octane of motor fuels climbed last year to 85.3 for regular and 92.8 for premium, but auto engines soon to be offered to the public will require 100 octane gasoline.

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• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE ADVANCEMENT OF SCIENCE: Vol. XI, No. 44—*British Association for the Advancement of Science*, 108 p., illus., paper, seven shillings and sixpence. Including papers delivered at the Oxford meeting of the Association.

ADVANCES IN GEOPHYSICS: Volume 2—H. E. Landsberg, Ed.—*Academic*, 286 p., illus., $7.50. Another volume cutting widely across various subfields of the science from weather forecasting to radioactive dating.

ATOMIC AND NUCLEAR PHYSICS—Robert S. Shankland—*Macmillan*, 529 p., illus., $7.75. With some emphasis on the historical point of view but "not slavishly chronological."

BARN SWALLOW—Paul McCutcheon Sears—*Holiday House*, 45 p., illus., $2.00. A book for children telling of the life of a pleasing bird.

BRITISH MOSSES AND LIVERWORTS: An Introductory Work, With Full Descriptions and Figures of Over 200 Species, and Keys for the Identification of All Except the Very Rare Species—E. Vernon Watson with a foreword by Paul Richards—*Cambridge University Press*, 419 p., illus., $8.50. A book for the beginner as well as a reference work for more advanced students.

CONCISE SCIENCE ENCYCLOPEDIA—G. E. Speck, Ed.—*Thomas Y. Crowell*, 256 p., illus., $3.50. Defining terms and describing facts in those branches of science which are considered most interesting to the general public.

FLOODS—William G. Hoyt and Walter B. Langbein—*Princeton University Press*, 469 p., illus., $7.50. Scientists of the U. S. Geological Survey give you information about the causes of floods and how they can be prevented, adapted to, or controlled.

GARDENING HANDBOOK—T. H. Everett—*Arco*, rev. ed., 144 p., illus., $2.00. For the home gardener.

THE GATES OF THE SEA—Philippe Diolé, translated from the French by Alan Ross—*Messner*, 176 p., illus., $4.50. Record of an amphibious journey around the coasts of Sicily, made as much under the water as on it and halted by continual diving.

MAMMALS: A Guide to Familiar American Species—Herbert S. Zim and Donald F. Hoffmeister—*Simon and Schuster*, 160 p., illus., paper $1.00, cloth $1.95. A pocket size book beautifully illustrated in color to help you to identfy the wild animals you may see during a hike.

PRACTICAL HORTICULTURE—James S. Shoemaker and Benjamin J. E. Teskey—*Wiley*, 374 p., illus., $4.20. A text for courses in vocational agriculture and a reference guide for gardeners.

SCIENCE AND THE HUMAN IMAGINATION: Aspects of the History and Logic of Physical Science—Mary B. Hesse—*Philosophical Library*, 171 p., $3.75. Based on a series of lectures and a dissertation at the University of London.

SHIPS OF THE CUNARD LINE—Frank E. Dodman—*Adlard Coles (John de Graff)*, 144 p., illus., $2.50. Photographs, silhouettes, and data to aid in recognition of this line of ships.

SHIPS OF THE P & O—Captain A. G. Course—*Adlard Coles (John de Graff)*, 79 p., illus., $1.50. To help the ship enthusiast to identify ships of the Peninsular and Oriental line.

SHOPPING HABITS AND TRAVEL PATTERNS: A Supplement to Special Report 11 "Parking as a Factor in Business"—Alan M. Voorhees and others—*Highway Research Board*, Special Report 11-B, 21 p., illus., paper, 75 cents. The average shopper does not behave at random but follows a fairly distinct pattern.

A STUDY OF ABORTION IN PRIMITIVE SOCIETIES: A Typological, Distributional, and Dynamic Analysis of the Prevention of Birth in 400 Preindustrial Societies — George Devereux — *Julian*, 394 p., $6.50. Adding another "inch to the bridge which, one day, will inevitably link the social and the psychological sciences."

TELEVISION TUBE LOCATION GUIDE: Enables Preliminary Diagnosis Without Chassis Removal —*Howard W. Sams Co.*, 196 charts, illus., paper, $2.00. Providing information for the television service technician.

WHEELS: A Pictorial History—Edwin Tunis—*World Publishing Company*, 96 p., illus. with drawings by the author, $3.95. The story of wheels from the ancient Egyptian sledge on rollers to the latest transcontinental bus told in text and drawings.

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AERONAUTICS

"Ducted Fan" Jet Engine Proposed for Airlines

➤ A "DUCTED fan" jet engine, with its increased efficiency at speeds of about 500 miles an hour, may be the power plant for a high performance commercial jet.

Such an engine would not only save fuel, but is expected to be far quieter than conventional jets, which are among the noisiest machines man has yet devised.

These advantages were outlined by George F. Wislicenus, director of Pennsylvania State University's Garfield Thomas Water Tunnel, at a meeting of the Society of Automotive Engineers in New York.

The ducted fan engine, which as yet has been used only on experimental planes, is a modification of the conventional turbojet. The difference is that not all of the air entering the nose is used to burn fuel. A portion of the intake is drawn off before it reaches the combustion chamber, then reintroduced into the main flow near the exhaust. This extra air provides added thrust for the engine.

Mr. Wislicenus confined his discussion to flights at about 500 miles an hour at a 30,000-foot altitude and a 3,000-mile range, the conditions airlines are interested in.

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BIOLOGY

Damp Cold Not So Bad When Felt Undressed

➤ WHETHER OR not you have clothes on determines whether you feel colder on a cold damp day than on a cold dry day.

Studies showing this were reported at the meeting of the Federation of American Societies for Experimental Biology in San Francisco by a Canadian research team.

Men tested without clothes on felt colder when the humidity was low than when it was high, and their bodies responded more by shivering and by other physiological changes. The investigators explain this unexpected result by suggesting that the human skin takes up moisture from the air and so affects the nerve endings of the skin, which are responsible for our sensations of cold and for the reactions of the body.

The scientists were Dr. Alan C. Burton, University of Western Ontario, London, Ont., Flight Lieut. W. R. Leach, Royal Canadian Air Force, and Dr. R. A. Snyder of the Defence Research Medical Laboratories. The investigation was financed by the Defence Research Board of Canada.

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CHEMISTRY

Woolens Protected From Moths With Dieldrin

➤ WOOLENS, PACKED away this spring for use next winter, can be protected from moth attacks with dieldrin.

Dieldrin has been found to be an effective mothproofing agent that outlasts other insecticides, such as D.D.T., even after repeated washings and dry-cleanings. Results of experiments conducted by M. Lipson and R. J. Hope of the Wool Textile Research Laboratory in Geelong, Australia, and reported in London, show that dieldrin-treated wool kills moth larvae.

A 0.05% dieldrin treatment gave mothproof protection that persisted after the article had been washed one and one-half hours and dry cleaned one hour.

A powerful household insecticide, dieldrin is effective too in killing ants, silverfish, cockroaches and fleas. It is not recommended for a general household spray in the United States, however, but only for spot treatments.

In a report to *Nature* (April 2), the Australian scientists also said that preliminary studies indicate that dieldrin is effective against carpet beetles.

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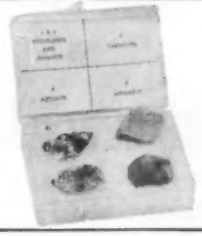

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METEOROLOGY

Fewer Icebergs This Year

Temperature readings in Gulf Stream indicate that the number of icebergs that peril ships sailing the North Atlantic trade routes will drop below the usual 400.

➤ FEWER ICEBERGS than usual will plague U. S.-European shipping this year, Louis A. Post of the U. S. Navy Hydrographic Office predicted to SCIENCE SERVICE.

Mr. Post, who bases his predictions upon temperature recordings taken in the Gulf Stream off Key West, Fla., said that all indications point to a light iceberg year. He cautioned, however, that icebergs may appear in the shipping lanes in the latter part of the season, which is from March through June.

Usually each spring, 400 or more icebergs invade the trade routes of the North Atlantic, menacing international shipping. The towering, floating white mountains drift southward from their birthplace along the coast of Greenland. A heavy invasion means that the shipping industry must reroute freighters and liners south, out of the danger area.

Mr. Post, whose studies are made independently of the Hydrographic Office, discovered that the water temperature off Key West provides an annual key to the iceberg crop. He found that when the water is warmer than usual early in the same year, bumper crops can be expected. He also found that colder than usual water at Key West meant heavy iceberg invasion three years later, the time required for water at Key West to make the circuit around Baffin Bay and reappear as the Labrador Current off the Grand Banks at Newfoundland.

Using his formula for his 1955 prediction, Mr. Post said that early in 1952 monthly surface water temperatures at Key West averaged one to two degrees Fahrenheit above normal. This means, he pointed out, that the Labrador Current will not be carrying the icebergs as far south as usual. He also reported that in January and February of this year the water was one to three degrees below average indicating the Gulf Stream will strongly resist the penetration of icebergs into the shipping lanes.

The Gulf Stream began to weaken last month, however, and icebergs may drift farther south towards the end of the season.

The currents in which the deceptive icebergs move are part of the great Gulf Stream system, which extends deep into the Arctic along the West Coast of Greenland on which most of the iceberg-forming glaciers are situated. The iceberg-laden stream then returns southward along the coast of Labrador where it is known as the Labrador Current.

The Labrador Current and the Gulf Stream meet at the Grand Banks off Newfoundland in the region referred to as the "cold wall." It is in this region that the greatest temperature contrasts in the world are to be found. And it is not unusual for a sailor to be swimming in the warm tropical Gulf Stream and watch an iceberg float nearby in the Arctic current.

Icebergs are also spotted and tracked constantly by the International Ice Patrol, whose creation was spurred by the most celebrated iceberg disaster in history, the sinking of the Titanic on April 14, 1912.

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PSYCHOLOGY

Loud, High Sounds Confuse Up Sensation

➤ DOES THE noise of his airplane disturb the pilot's perception of which way is up?

This question is raised by a report to the Eastern Psychological Association in Philadelphia.

In an experiment conducted by Dr. Kenneth A. Chandler of the University of Bridgeport, Bridgeport, Conn., nearly 50 male and female college students sat erect in the dark and told an examiner how to adjust a luminescent rod so that it appeared to them to be vertical. Meantime they were exposed to loud and high-pitched sounds.

The louder the tone, Dr. Chandler found, the more the rod might be tipped to be accepted by the subject as straight up and down.

Great individual differences were found in the ability to perceive the vertical. There were differences also in the extent to which the loud sounds would disturb this perception.

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MEDICINE

Food Without Exercise Makes Middle-Aged Fat

➤ TOO MUCH food without enough exercise is what fattens bodies and arteries of middle aged men, causing "significant hardening of the arteries."

Studies showing this were reported by Dr. George V. Mann and Misses Katherine Teel, Olive Hayes, Ann McNally and Dorothy Bruno of Harvard School of Public Health, Cambridge, Mass., at the meeting of the Federation of American Societies for Experimental Biology in San Francisco.

In the study, the periods of vigorous youth and sedentary middle age of the average man were capsuled into 10 weeks for four 24-year-old men. The four were put on a big-meal, heavy-exercise routine, typical of young adults, and then shifted to the big-meal, light-exercise routine of many mature businessmen. They all put on fat. When their meals were cut back to moderate supplies of calories, commensurate with the moderate exercise of middle-age, they stopped putting on weight.

The three who completed the schedule reported they could stand cold weather better and were feeling well, relaxed and rugged, slept better and worked more efficiently, during the period of big meals with strenuous exercise that kept their weight to within five pounds of normal.

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MEDICINE

Thin Old Bones Made Strong by Sex Hormone

➤ WHEN OLD people, especially women, complain of backache, they may be suffering from a "thinning of the bones" called osteoporosis.

Sex hormone treatment remedies the condition, Dr. Gilbert S. Gordan of San Francisco reported to the American Academy of General Practice in Los Angeles.

The vertebrae in the lower back are especially likely to be affected by this bone thinning and often they break because of it.

The disorder results from inadequate formation of protein tissue of the bones, Dr. Gordan explained. The fundamental reason is that the chief stimulus to formation of bone tissue is the action of the sex hormones. When these are no longer present, either because of age or because the ovaries have been removed by operation or destroyed by X-ray treatment, osteoporosis develops.

Simple replacement of the missing hormones therefore gives good results.

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Questions

ANTHROPOLOGY—What is the latest theory on how man's brain became so large? p. 277

□ □ □

CHEMISTRY—What is the isotope that has filled one of the few remaining gaps in chemists' charts? p. 279.

□ □ □

MEDICINE—What is the role of the enzyme uricase in gout? p. 276.

□ □ □

OCEANOGRAPHY—What is the composition of the magnetic stones found on the ocean floor? p. 279.

□ □ □

PUBLIC SAFETY—How does temperature affect the radiation danger? p. 277.

□ □ □

Photographs: Cover, Convair; p. 274, Cornell University; p. 275, Bell Telephone Laboratories; p. 278, Westinghouse Electric Corporation; p. 282, Fremont Davis; p. 288, Marsh Photographers, Inc.

BOTANY

NATURE RAMBLINGS

Bloodroot

➤ A GOOD theme for a botanist-poet might be supplied by the bloodroot, which now stars our woods. Such a one might well hail the little white flower as a "modest poppy" that

"Crowds back its carmine blushes to its root
And turns toward all ardors of the sun
A front demure and white as any nun."

For the bloodroot is really a close cousin of the poppy, and the red that its relative flaunts on its face, this little white spring blossom expresses only in its blood-red sap. It would not be exactly correct, however, to say that the red sap is found in its root, for the thick underground part of the plant is really a rhizome or subterranean stem, from which the true roots, as well as the over-ground stems, take their rise.

Few wild flowers are more lovely than the bloodroot, *Sanguinaria canadensis*. It grows in rich, shady woods, on rocky hillsides, in thickets and on waste lands over most of the United States east of the Rocky Mountains. Only fleeting enjoyment, however, comes from its golden-centered, poppy-like blossoms, since the snow-white petals show themselves for just two or three April or May days before departing.

The sap of the subterranean stem is somewhat thick and milky under its red color, which is another point of kinship with the milky-juiced poppy tribe. And as the juice of the poppy contains a poisonous principle used in medicine, so also does the juice of the bloodroot. Under the Latin name Sanguinaria, the dried rhizome used to find a more or less prominent place on druggists' shelves, though it is little used now.

The bloodroot is one of the small number of native American wildflowers that needs little warning against reckless bouquet-gathering, due again to that same thick, red, rather irritating juice.

Children picking flowers in the woods sometimes take a handful of its attractive, though short-lived white flowers; but the appearance of their hands and dresses usually causes their alarmed mothers to place further bloodroot gathering under stern injunction.

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AERONAUTICS

Downtown Heliports Seen

➤ COMMERCIAL DOWNTOWN heliports which may spring up in every large city in the country will probably be on the ground and smaller than a city block.

Assuming that helicopters of the future will not vary radically from present-day models, the field should measure about 200 by 400 feet. Except for parking room, most of the heliport area is set aside for emergency landing space. Rooftop heliports are undesirable, Horace Brock, executive vice president of New York Airways, Inc., told the meeting of the Society of Automotive Engineers in New York.

They would not only raise the operating altitudes, which would present flying difficulties in bad weather, but would add problems with elevator service, baggage and fuel handling.

Corrosion of the helicopter and problems in transporting baggage and passengers make operation from water also "very undesirable."

The ideal city heliport would have a wide unobstructed street-level approach. Stationing the field near railroad yards, parks, ponds, waterways, or widely divided highways would permit this ease of approach.

Midtown heliports would not be undesirable because of noise or gusts since the helicopter engine is not loud and not of an annoying pitch. The downwash dissipates quickly. But the ports should be dust free and shelter areas should be provided for visitors and passengers.

Suburban heliports of the future will probably be found near parking lots, filling stations, post offices, resorts and large factories.

The potential use of such a network of heliports was pointed up in another paper presented by Grahame H. Aldrich, director of special projects for the Air Transport Association of America.

Approximately 89% of all intercity traffic, he said, is for distances less than 250 miles per trip. In 1954 there were 444,000,000 such passengers in the United States. This is the potential market for helicopter travel.

Helicopters will probably carry from 35 to 50 passengers plus baggage and cargo.

Today the only midtown heliport operating day and night is in Trenton, N. J. In this respect, the U. S. is far behind Europe, in which there are seven such heliports with one more under way in Paris.

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PSYCHOLOGY

Scales Help Salvage From "Human Scrap Pile"

➤ SALVAGE OF the mental patients now pushed onto the "human scrap pile" of the closed, back wards of mental hospitals will be aided by two scientific devices reported to the Eastern Psychological Association in Philadelphia.

Two rating scales will spot among the little known and often forgotten men and women those who will respond to special treatment well enough so that they can be discharged from the hospital. The scales correctly pick three-fourths of those who respond to treatment. They also mark as "poor risks" three-fourths of those who actually fail to benefit from the special treatment.

The new scales were reported by Drs. F. Harold Giedt and Richard Sanders of the Veterans Administration Hospital, Perry Point, Md.

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MEDICINE

Cancers Need More Protein Builders

➤ DISCOVERY THAT cancers need three more protein-building amino acids than the nine required by the human body for its growth was announced by Dr. Harry Eagle of the National Institutes of Health, Bethesda, Md.

The extra requirement is for the growth of human cancer cells in tissue culture outside the body.

Normal cells from mouse connective tissue also need the extra three amino acids.

Besides giving a lead to more knowledge of the basic differences between cancer cells and normal cells, the findings, reported at the meeting of the Federation of American Societies for Experimental Biology in San Francisco, are expected to help in the use of tissue cultures for growing viruses, such as the polio virus, outside the body.

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• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 776. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

HOMEMADE CLOCK is designed for the do-it-yourself fan. The timepiece kit contains all the parts needed to build a full-sized wall clock. The face of the all-hardwood clock measures 12 inches square and 19 inches from the top of the face to the bottom of the pendulum.

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HOSTESS APRON made of either flaked or plain linen features two napkins, one in each of two pockets. Guaranteed color fast and measuring 18 inches by 34 inches, the apron with the napkins was designed for quick serving by a busy homemaker.

Science News Letter, April 30, 1955

PORTABLE GENERATOR weighing approximately 30 pounds is a completely self-contained gasoline-engine-driven package that supplies 26 volts DC at 50 amperes continuously. Ideal for boats, trailers, camps and aircraft, the bantam weight generator has a carrying handle and suction-cup feet for securing it.

Science News Letter, April 30, 1955

BACKYARD RAILROAD for junior engineers choo choos one or two children around its circular track. The hand-car, shown in the picture, and 40 feet of rail-

road track come as a unit, providing a roadbed of 12 feet in diameter. More track can be added. In operation, muscle building handpower by the kids turns the chain drive connected to the rear wheels.

Science News Letter, April 30, 1955

BRIEFCASE RECORDER offers sleuths and private eyes a unique secret means for recording. Camouflaged in an average sized leather briefcase, the battery-operated magnetic tape recorder enables the natural recording of comments, conversations and conferences. The unit weighs 11¼ pounds and records for 1½ hours.

Science News Letter, April 30, 1955

EMERGENCY SIGNS and markers can be seen inside a factory even if the plant is completely blacked out. Made of reflective sheeting mounted on non-corrosive aluminum, the signs can be seen and read up to several hundred feet away with a flashlight. Looking the same in daylight or under flashlight beams, the signs are in full color.

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SPRAYING AID is a chemical, eight to ten drops of which make each gallon of garden spray spread better and last longer. Available now for gardeners, the material has been long used by commercial sprayers. The chemical keeps the spray from "beading," and slows down weathering.

Science News Letter, April 30, 1955

SPORTING TOY is a harmless adaptation of South American "bolas," the traditional South American Indian and gaucho war weapon. Made of pliant rawhide and three soft rubber balls, the boleto is thrown by grasping one ball and whirling the others over head.

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Do You Know?

Varying the color of an object was found to change its apparent *distance* from an observer.

Though females pass *hemophilia*, a blood disease, from generation to generation, they are rarely afflicted themselves.

An all-electronic direct-reading *spectrograph* has been developed that can analyze up to 65 different elements in two minutes.

Addiction to opiates occurs most frequently in males, usually begins early in the second decade of life and is most frequent in the economically depressed areas of certain large cities.

Physical exertion, fever, drugs, abnormal environment, and burns may interfere with one's use of food and bring about a nutritional deficiency on *diets* that would ordinarily be adequate.

The *soldier ant* in many species blocks the entrances of the colony's wood burrows; the worker who wants to come out taps the soldier with her antennae and he steps aside.

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